

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

<b>In re application of:</b> Joshi, et al.	
<b>Serial Number:</b> 10/749,152	<b>Examiner:</b> Picardat, Kevin M.
<b>Filing date:</b> December 31, 2003	<b>Group Art Unit:</b> 2822 <b>Confirmation No.:</b> 1327
<b>Title:</b> Soft Metal Conductor and Method of Making	IBM Corporation D/18G, B/321, Zip 482 2070 Route 52 Hopewell Junction, NY 12533-6531

**DECLARATION UNDER 37 C.F.R. § 1.131**

Hon. Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

Sir:

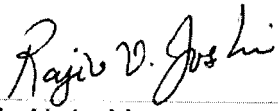
I, the undersigned, hereby declares as follows:

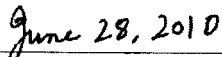
1. I am the inventor of the subject matter described and claimed in the above-identified patent application.
2. I have read and understood the patent application including claims 1-16 currently pending in the application.
3. I have reviewed US Patent No. 5,523,259 to Merchant et al. (filed Dec. 5, 1994).
4. Prior to November 16, 1992, I conceived and reduced to practice of the idea for at least one embodiment of the invention for a soft metal conductor for use in a semiconductor device comprising grains having grain sizes larger than 200 nm so as to provide a substantially scratch-free surface upon polishing in a subsequent chemical mechanical polishing step, said soft metal conductor being formed by at

- least one metal selected from the group consisting of Al, Cu and Ag, and a method of making such a soft metal conductor for use in a semiconductor device.
5. The conception and reduction to practice mentioned in paragraph 4 above were carried out in the United States.
  6. The conception and reduction to practice mentioned in paragraph 4 above are evidenced by the attached Exhibits A, B, C & D. The photographs in Exhibits A, B, C & D are of Cu that comprises grains having grain sizes larger than 200 nm so as to provide a substantially scratch-free surface upon polishing in a subsequent chemical mechanical polishing step, as referred to in paragraph 4 above. In the photographs in Exhibits A, B, C & D, the layers to which the words "large grain(s)" point all have grains having grain sizes larger than 200 nm. These layers are formed by Cu.
  7. Prior to November 16, 1992, I conceived and reduced to practice of the idea for at least one embodiment of the invention for an electrically conducting soft metal structure for use in a semiconductor device comprising: an uppermost layer consisting of grains having grain sizes not smaller than 200 nm, and a second layer contiguous with and immediately adjacent to said uppermost layer consisting of grains having grain sizes not larger than about 20% of the thickness of said soft metal structure, and a method of making such an electrically conducting soft metal structure for use in a semiconductor device.
  8. The conception and reduction to practice mentioned in paragraph 7 above were carried out in the United States.

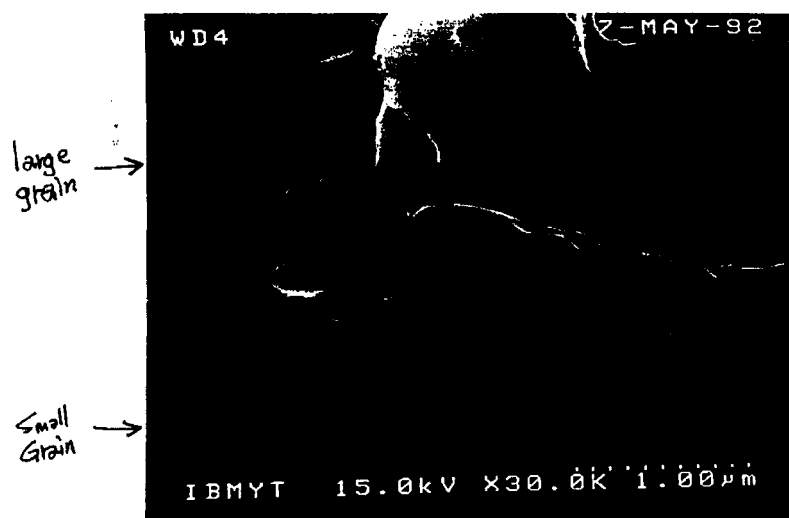
9. The conception and reduction to practice mentioned in paragraph 7 above are evidenced by the attached Exhibits A, B & C. The photographs labeled A-1, B-1 and C-1 in Exhibits A, B & C are of Cu that comprises an uppermost layer consisting of grains having grain sizes not smaller than 200 nm, and a second layer contiguous with and immediately adjacent to said uppermost layer consisting of grains having grain sizes not larger than about 20% of the thickness of said soft metal structure, as referred to in paragraph 7 above. In photographs A-1, B-1 & C-1, the layers to which the words "large grain(s)" point are the uppermost layer, as referred to above. These layers consist of grains having grain sizes not smaller than 200 nm. The layers to which the words "small grain(s)" point are the second layer, as referred to above. These layers are contiguous with and immediately adjacent to the uppermost layer and consist of grains having grain sizes not larger than about 20% of the thickness of the soft metal structure.
10. The dates the photographs mentioned in paragraphs 6 and 9 above were produced are May 24, 1991, April 14, 1992, May 7, 1992 and July 28, 1992 (shown on top of the photographs).
11. The photographs in Exhibits A, B, C & D are photocopies of the original photographs labeled Exhibits A, B, C & D included in an Affidavit which was submitted to the United States Patent and Trademark Office on September 18, 2000.
12. I hereby declares that all statements made herein of my own knowledge are true and that all statements made on information or belief are believed to be true; and further that willful false statements and the like so made are punishable by fine or

imprisonment, or both, under Section 1001 or Title 18 of the United States Code  
and that such willful false statements may jeopardize the validity of the  
application or any patent issued thereon.

  
\_\_\_\_\_  
Rajiv V. Joshi

  
\_\_\_\_\_  
Date

A-1



A-2

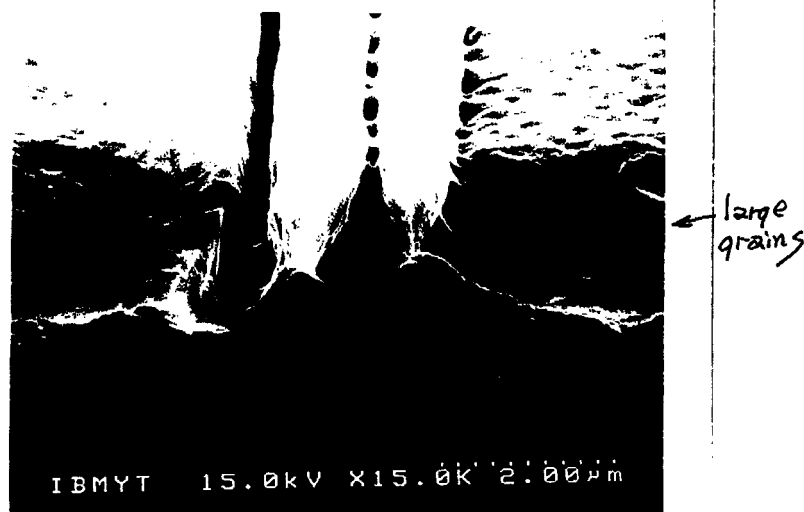
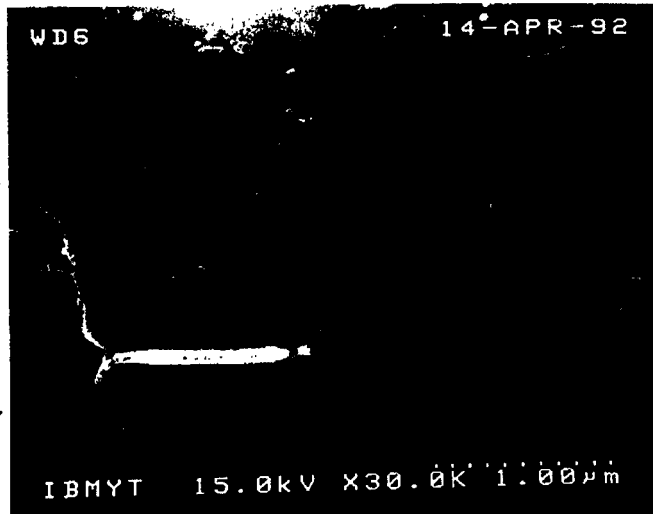


Exhibit A

B-1

large grains

small grains



B-2

large grains



Exhibit B

C-1



large  
grains

small  
grains

C-2

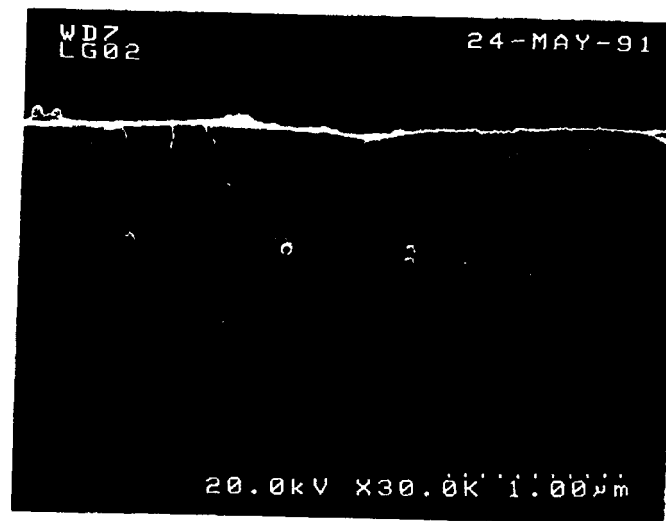
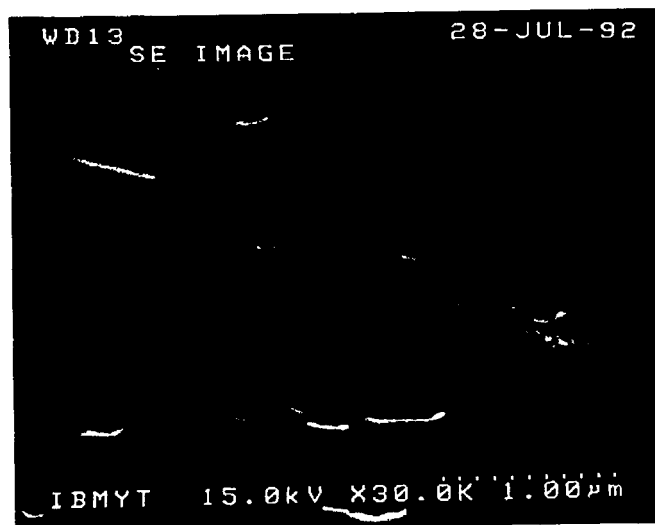


Exhibit C

D-1



large grains

D-2



Exhibit □